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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/384,971	08/30/1999	MASAHIKO KUBOTA	35.C13752	8550
5514	7590	11/28/2003	EXAMINER	
FITZPATRICK CELLA HARPER & SCINTO 30 ROCKEFELLER PLAZA NEW YORK, NY 10112			BROOKE, MICHAEL S	
			ART UNIT	PAPER NUMBER
			2853	

DATE MAILED: 11/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/384,971

Applicant(s)

KUBOTA ET AL.

Examiner

Michael S. Brooke

Art Unit

2853

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 November 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4,5,9-11,14,15 and 19-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4,5,9-11,14,15 and 19-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 August 1999 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/12/03 has been entered.

Claim Objections

2. Claims 1, 11, 22 and 23 are objected to because of the following informalities:

These claims have been amended to recite that the second region "is disposed asymmetrically in a side of the discharge port between said pair of electrodes along the direction." This language appears to be in error, since the second region is not disposed in the discharge port. It appears that the language should read "on a side of the discharge port." For the purposes of examination, this language will be interpreted in this manner.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 4, 5, 9, 21/1 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ozaki et al. (5,660,739) in view of Shirato et al. (4,458,256).

Ozaki et al. teaches an ink jet print head comprising a heat generating element (107) that is connected to a pair of electrodes (103, 104) and which discharges ink from a discharge port (1111). As discussed at col. 5:32, a first protective coating (108a), made of PSG, is provided over the heat generating element. The PSG coating is etched with a solution of buffered fluoric acid (hydrofluoric acid). After the PSG layer has been etched away, a second protection layer (108b), made of SiN, is deposited over the PSG layer and the etched portion. As can be seen in Fig. 2, this results in a structure, wherein the protective coating has a first region that is formed from two layers and has a substantially uniform thickness along a direction connecting the pair of electrodes and a second region that is formed of a single layer, has a substantially uniform thickness along a direction connecting the pair of electrodes and is stepwise thinner than the first region. Looking at Figs. 2 and 7, it can be seen that the second region is closer to the nozzle than the first region. Ozaki et al. further teaches that the heat generating element is made of TaN, which inherently has a positive temperature coefficient. Fig. 8 illustrates a member (HC) for mounting the print head. Furthermore, looking at Fig. 2 of

Ozaki et al., it can be seen that the first and second regions are disposed between the electrodes (103 and 104). The Applicant has added the limitation that the second region "is disposed asymmetrically in a side of the discharge port between said pair of electrodes along the direction." This limitation is taught by Ozaki et al. Since the size of the first region is different than the size of the second region, the second region would be disposed asymmetrically on a side of the discharge port.

Ozaki et al. teaches the claimed invention with the exception of varying the energy applied to the heat generating element to change the volume of the ink droplet.

Shirato et al. teaches that it is known in the ink jet art to vary the amount of energy applied to the heat generating element in order to vary the size of the ink droplet (col. 4:28-41). By recording with different drop sizes, an image having different print densities can be formed.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided Ozaki with means to change the volume of the ink drop by varying the energy applied to the heater, so that an image having different printing densities can be formed, as taught by Shirato et al.

The steps of the method of claim 22 are deemed to be obvious in view of the functions of the combination described above, in that when the combination performs its intended functions, it would necessarily perform the claimed method steps.

5. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ozaki et al. (5,660,739) in view of Shirato et al. (4,458,256), as applied to claims 1, 4, 5, 9 and 21/1 above, and further in view of Matsumoto (4,429,321).

Ozaki et al., as modified, teaches the claimed invention with the exception of a driving circuit having a plurality of function devices for driving the heat generating elements provided with the substrate.

Matsumoto teaches an ink jet head comprising an epitaxial layer (119) which is a substrate. The substrate contains a plurality of function elements (11) which drive the heat generating elements (105). Integrating the function devices into the substrate provides the advantage of improving printing speed and recording element density col. 1:26-54).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided Ozaki et al., as modified, with function elements in the substrate which drive the heat generating elements for the purpose of improving printing speed and density, as taught by Matsumoto.

6. Claims 11, 14, 15, 21/11 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ozaki et al. (5,660,739) in view of Shirato et al. (4,458,256) and Nakata et al. (EP-764,531).

Ozaki et al., as modified, teaches the claimed invention, as discussed above, with the exception of a moving member.

Nakata et al. teaches an ink jet print head comprising a moving member (31) for the purpose of directing the propagation of the pressure wave toward the ejection outlet, thereby increasing ejection efficiency, ejection force and ejection speed (see Summary).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided Ozaki et al, as modified, with a moving member

for the purpose of directing the propagation of the pressure wave toward the ejection outlet, thereby increasing ejection efficiency, ejection force and ejection speed, as taught by Nakata et al.

The steps of the method of claim 23 are deemed to be obvious in view of the functions of the combination described above, in that when the combination performs its intended functions, it would necessarily perform the claimed method steps.

7. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ozaki et al. (5,660,739) in view of Shirato et al. (4,458,256) and Nakata (EP-764531), as applied to claims 11, 14, 15 and 21/11 above, and further in view of Murthy et al. (5,658,471).

Ozaki et al., as modified, teaches the claimed invention with the exception of the heat generating element being composed of polycrystalline silicon.

Murthy et al. teaches that HfB_2 and polysilicon (polycrystalline silicon) are art recognized equivalents for making a heat generating element (col. 7:1-3). Because these two materials were art recognized equivalents at the time the invention was made for making a heating element for an ink jet print head, one of ordinary skill in the art would have found it obvious to substitute a polycrystalline silicon heat generating element for the HfB_2 heat generating element taught in Ozaki et al., for the purpose of ejecting a droplet of ink.

8. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ozaki et al. (5,660,739) in view of Shirato et al. (4,458,256) and Nakata (EP-764531), as applied to claims 11, 14, 15 and 21/11 above, and further in view of Matsumoto (4,429,321).

Ozaki et al., as modified, teaches the claimed invention with the exception of a driving circuit having a plurality of function devices for driving the heat generating elements provided with the substrate.

Matsumoto teaches an ink jet head comprising an epitaxial layer (119) which is a substrate. The substrate contains a plurality of function elements 911) which drive the heat generating elements (105). Integrating the function devices into the substrate provides the advantage of improving printing speed and recording element density col. 1:26-54).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided Ozaki et al., as modified, with function elements in the substrate for driving the heat generating elements for the purpose of improving printing speed and density, as taught by Matsumoto.

Response to Arguments

9. Applicant's arguments, filed 11/12/03 are not persuasive.

As discussed above, Ozaki et al. teaches the newly added limitation.

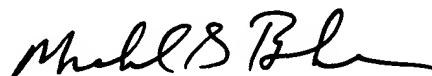
10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael S. Brooke whose telephone number is 703-305-0262. The examiner can normally be reached on M-F 5:30-2:00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen D. Meier can be reached on 703 308-4896. The fax phone number for the organization where this application or proceeding is assigned is 703-305-3431.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4900.

A handwritten signature in black ink, appearing to read "Michael S. Brooke". The signature is fluid and cursive, with the first name "Michael" and last name "Brooke" clearly distinguishable.

Michael S. Brooke
Examiner
Art Unit 2853

MSB
11/23/03